NavMed P-369

UNITED STATES NAVY

MEDICAL NEWS LETTER

Vol. 39 Friday, 16 February 1962 No. 4

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Please forward changes of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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The issuance of this publication approved by the Secretary of the Navy on 28 June 1961.

SPECIAL REVIEW - Ocular Manifestations of Mumps

Ralph S. Riffenburgh MD, Pasadena, Calif. Arch Ophthal 66: 155-159, November 1961.

(NOTE: Doctor Riffenburgh's Special Review of the "Ocular Manifestations of Mumps" is quite important to Medical Officers of the Armed Forces who are responsible for the diagnosis and treatment of all aspects of mumps in a large young adult population—not merely parotitis and an occasional orchitis. A high index of suspicion would prove useful in detecting some of these many ocular manifestations of this viremia. Readers are encouraged to refer to the original of this outstanding article which contains 67 well selected references from the medical literature, foreign and domestic. —Editor)

Mumps is usually considered a disease of children but its occurrence is common among nonimmune adults. Epidemics are frequent in military establishments. There have been many reports of complications of mumps, but the present knowledge of mumps leads to the conclusion that the customary term "complications" is erroneous and that manifestations is a better term. Mumps is a viremia rather than a localized infection in the salivary glands and involvement elsewhere is another manifestation of the viremia rather than a complication of the parotid involvement.

It has been found that the usual occurrence of extrasalivary manifestations is in the adult case. Most of these manifestations are rare in children. Many different manifestations have been reported, the commonest being orchitis and pancreatitis. An article summarizing many of the manifestations, with emphasis on their military significance, includes dacryoadenitis and optic neuritis as rare manifestations, but mentions no other ophthalmic forms. These two are the most common of ocular involvements; many other rare ocular manifestations exist, mostly little known.

There have been a number of reviews of the ocular manifestations of mumps. The most complete reviews have appeared in the French literature, having been written by Villard in 1927 and Bonnet in 1938. There have been many case reports since, but little has actually been added except in the fields of experimental disease and laboratory diagnosis. Considerable work has been done on skin testing and the complement fixation test for mumps.

Papp now considers it possible for mumps to inoculate the conjunctiva and be the point of entry for infection.

Dacryoadenitis

Lacrimal gland involvement associated with mumps is the most common of the ocular manifestations. In a 1903 epidemic among soldiers, an incidence of 20% of lacrimal gland involvement was found. This figure is usually still quoted—at least for adults—due to the lack of any other series of a large number of mumps cases carefully observed for dacryoadenitis. The lacrimal

swelling usually comes on during the parotid involvement, frequently at the same time as the development of an orchitis. Cases have been reported where the lacrimal swelling preceded, or was concurrent with, that of the parotids; in the presence of an epidemic, this may allow the diagnosis of mumps to be made before the salivary involvement becomes manifest.

Involvement of the lacrimal glands is usually bilateral. There is a sudden onset of pain in the orbits, radiating frontally and temporally. There follows rapid development of edema and redness of the lids, mostly laterally. The conjunctiva is edematous and there may be marked chemosis. The eye appears proptosed and there may be difficulty in motion of the lids. On palpation, a large mass is found in the superior lateral portion of the orbit, very tender on pressure, with an elastic or cartilaginous feeling.

There are also lesser degrees of involvement of the gland, varying from merely increased tearing through all stages to the typical acute form just described.

After several days, swelling of the gland begins to subside and the pain and edema disappear fairly rapidly, though resolution of the gland infiltration may not be complete for several weeks. The prognosis is good, even in the severest cases, and healing is almost invariably complete without any residual. Warm compresses may help relieve the pain; this is the only treatment indicated. Suppuration may occur, but it is very rare.

During epidemics, a few cases have been seen where there was typical lacrimal gland swelling in persons exposed to mumps without development of parotid involvement. This has been given the name "lacrimal mumps." Since the time of Hirshberg, some have felt that certain epidemics may have a predilection for lacrimal mumps. Recently, a report described an epidemic of 100 cases of lacrimal mumps.

Optic Neuritis

Involvement of the optic nerve ranks next to that of the lacrimal gland as the most common ophthalmic lesion of mumps. It is probably associated with a more general involvement of the central nervous system. Meningoencephalitis has been estimated to occur in from 0.01% to 65% of the cases of mumps. It is the gravest complication and may produce hemiplegia, anesthesia, aphasia, chorea, and even convulsion and death.

The optic nerve involvement is usually bilateral and unlike most other forms of optic neuritis, the retrobulbar form is rare in comparison with neuroretinitis or papillitis. The retrobulbar form is characterized by the usual central scotoma giving visual loss and a normal ophthalmoscopic picture.

The papillitis shows a hyperemia of the disc with elevation and edema of the retina surrounding the disc and is associated with visual loss and field changes. The majority of these cases show spontaneous resolution with return of normal vision in 10 to 20 days. A certain number, however, go on to show a typical secondary optic atrophy of varying degree, some even to

blindness. Lasvalades, in an analysis of cases, has shown that atrophy is most likely in those with a delayed onset of the optic nerve lesion. Atrophy rarely occurs in those cases in which the onset is during the parotid swelling. In cases in which the optic nerve is not involved until a month or more after the onset of the parotic swelling, atrophy is the rule.

A systematic study of mumps cases showed that a mild degree of disc hyperemia and blurring of the margins is found in a majority of cases not associated with any eye symptoms. This has also been noted to appear before the parotid swelling in some cases which have been observed following exposure to mumps.

A number of cases of third and sixth nerve involvement, one of unilateral paralysis of elevators, and one of bilateral total external ophthalmoplegia have been reported. These are probably a result of meningitis rather than a localized effect on the involved nerves or nuclei. This is suggested by the frequent association of such paralyses with hemiplegia, anesthesia, or other cranial nerve involvement.

Accommodative paralysis is also found after mumps, appearing 2 to 4 weeks after the onset of the parotitis. Recovery has usually been complete within a month in both external ocular and accommodative paralyses.

Keratitis

A number of cases of keratitis associated with mumps have been reported and show a rather characteristic clinical picture. Danielson and Long reviewed the subject and listed all the previously reported cases. Most of the cases published since this have merely confirmed the picture.

Typically, the corneal involvement comes on shortly after the parotitis. The average time is 5 days, with a range from simultaneously to 11 days following the parotitis. The disease is usually unilateral but may be bilateral. There is a rapid loss of vision accompanied by tearing and photophobia, but with little pain. The vision at the height of the involvement may be reduced to only light perception. On examination, the cornea shows a severe and extensive keratitis profunda. The cornea appears a uniform gray with white interlacing fibrillae. The epithelium is usually intact, though staining has been noted. Recovery is prompt, averaging 20 days from onset, with no vascularization. There is return of the vision to normal, though a very fine nebula, not incompatible with normal vision, may be seen. This lesion differs from all other forms of keratitis profunda in the rapidity of development, the high density involvement of the entire cornea, and the rapid and complete clearing.

As a rule, the keratitis does not have observable signs of uveitis, though a typical iritis has been seen in association.

In addition to the typical case, a superficial keratitis with ulceration has been noted in association with mumps. In these cases, scarring of the cornea and visual loss have followed healing. A superficial punctate keratitis has also been reported. There has also been a report of a posterior keratitis

in a 6-year old, associated with iris hemorrhage and followed by blood staining of the cornea.

Iritis

Iritis and iridocyclitis following mumps were first reported in 1882, and there has been a recurrent argument about the mumps etiology since that time. Several cases have been reported in which the association with recent mumps is not given. Reith, on the basis of a case occurring 2 months after mumps, has concluded that iritis cases are not related to mumps, but are examples of Heerfordt's "subchronic uveo-parotitis" syndrome. This is now generally believed to be separate since iritis associated with mumps has a typical course, differing markedly from the prolonged course of Heerfordt's syndrome.

Typically, the mumps iritis comes on during the disease or the convalescence (4 to 14 days after the onset of the mumps). It is frequently associated with other manifestations, most commonly orchitis, and is most frequent in adults. The patient notes blurring of vision, mild pain, photophobia, and redness. On examination, the eye has a ciliary injection, flare, cells, and punctate KP typical of any serous iritis.

The course is benign. While the disease subsides rapidly on atropine, heat, and steroids, it is probably self-limited and subsides well without treatment as indicated by one case which cleared rapidly on pilocarpine. The duration varies from 5 days to a month. Five cases showing a duration of several months are all in the group in which the relation to mumps is questionable. In cases other than these, there have been no synechiae, visual loss, or other sequelae. Two cases have been reported in which there was an increase in intraocular pressure complicating the iritis.

One case of choroiditis has been reported following mumps. It is difficult to rule out coincidence here, though there is no reason to believe the posterior uvea could not be involved as well as the anterior.

Conjunctivitis

Conjunctivitis is not considered to be rare with mumps, though it is of low degree and not often mentioned in reports. Bonnet described it as a diffuse redness and edema of the conjunctiva, sometimes with chemosis, with a contrasting absence of secretion. He feels it is due to an adenitis of the accessory lacrimal glands. It disappears spontaneously in 4 to 6 days without residual damage.

Scleritis

There have been a few cases of scleritis and episcleritis of the benign type associated with mumps which follow the onset of parotitis by 3 to 13 days. The patient complains of redness and only mild pain and tenderness. The

marked dilation of both deep and superficial vessels may be accompanied by a surface roughening and parenchymatous opacity of the corneal periphery. The central part of the cornea is not involved and there is no visual loss. These are all of a benign type, clearing completely in 1 to 2 weeks.

Tenonitis

Two cases have been described of tenonitis showing chemosis and exophthalmos, with increased intraocular pressure due to the exophthalmos. From the information available, these could have been due to involvement of the lacrimal gland and other orbital structures as well as the capsule of Tenon.

Central Retinal Vein Occlusion

Two cases of central retinal vein occlusion associated with mumps have been reported. It has been suggested that the pressure of the enlarged parotid may so slow the venous flow as to allow thrombosis in a susceptible vein.

Infections

Two cases of dacryocystitis and one of lid abscess have been attributed to mumps. The likelihood is that they were due to spread of secondary infection with bacteria from the nasal passage or conjunctiva.

Congenital Abnormalities

A number of cases have been reported in which mumps in the mother during the early months of pregnancy was followed by congenital abnormalities. Ocular manifestations reported are corneal opacities, microphthalmos and posterior subcapsular lens opacity, and chorioretinitis. It is likely that with the increased awareness of maternal disease as a causative factor in abnormalities, more will be noted. Studies have been published on evaluation of the role of all virus diseases in pregnancy and the effects on the fetus.
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Librium in Spastic Disorders. Chlordiazepoxide, a new calming agent and muscle relaxant, was administered in varying dosages for 1-1/2 to 7-1/2 months to 94 institutionalized spastic patients, ages 1 to 45 years. Judged on the basis of reduction of spasticity, there was marked improvement in 20, moderate in 71, slight in 2, and none in 1. Two patients learned to walk for the first time, and there was 75% reduction in both spasticity and hyperactivity in one mongoloid previously considered unimprovable. (C. H. Carter MD, Medical Director, Sunland Training Center, Orlando, Fla. Arch Pediat 79: 22-27, January 1962)

Staphylococcal Septicemia Treated with Methicillin * Report of Twenty-Two Cases

J. D. Allen (1), C. E. Roberts Jr (2), and W. M. M. Kirby (3), Seattle, Wash. New Engl J Med 266: 111-116, January 18, 1962.

Since the introduction of penicillin into clinical medicine nearly two decades ago, infections due to antibiotic-resistant staphylococci have become an increasingly serious problem. Penicillinase producers now account for more than 80% of significant staphylococcal infections, and were largely responsible for the sevenfold increase in deaths from staphylococcal septicemia reported during the years 1949 to 1959. Treatment has been relatively unsatisfactory, partly because of the debilitated state of many patients with severe staphylococcal infections. In addition, the increasing prevalence of antibiotic-resistant organisms, the frequent occurrence of toxicity, and the relatively weak antistaphylococcal action of most antibiotics have limited the usefulness of many available drugs. An exception during recent years has been vancomycin which is bactericidal in action and has been responsible for many cures in cases of staphylococcal septicemia. Staphylococci resistant to this antibiotic have not been encountered in the authors' experience, but the usefulness of this drug has been limited by the necessity for intravenous administration and the occurrence of chills, fever, and phlebitis in some patients.

The recent discovery of methicillin, a semisynthetic penicillin resistant to the action of penicillinase, has added an agent potentially of great value in the treatment of severe staphylococcal infections.

One gram of methicillin given intramuscularly produces peak serum concentrations of 12 to 15 microgm per milliliter, whereas large inocula of staphylococci are uniformly inhibited in vitro by 4 microgm per milliliter or less. Since the ratio between the two figures may not be optimal, the authors have preferred to administer 2 gm of methicillin intramuscularly every 4 hours for at least the first day or two in patients with severe staphylococcal infections and to reduce the dose to 1 to 1.5 gm every 4 or 6 hours thereafter. Patients with a significant degree of renal insufficiency are usually given only 4 gm daily.

Methicillin can also be injected directly into the patient's vein or into the tubing of an intravenous infusion. The antibiotic should first be diluted in 10 to 20 ml of sterile saline solution and injected slowly over a 5-minute period. Serum concentrations of methicillin considerably higher than with the intramuscular route are attained within a few minutes and the levels then fall rapidly to nearly zero in 2 or 3 hours. Continuous intravenous infusions of methicillin in isotonic saline or dextrose solution can also be employed with the administration of 0.5 to 1.0 gm every hour to maintain adequate blood levels in patients with normal renal function. Because of low pH, solutions of methicillin in physiologic saline solution or 5% dextrose in water decline rapidly in antibiotic potency and must be completely used within about 4 hours. If the solutions are buffered by the addition of 6 to 7 milliequiv. of sterile

sodium bicarbonate per liter, antibiotic deterioration may be substantially reduced. The optimal duration of therapy in staphylococcal septicemia is difficult to determine, but it is of interest that all but 3 patients in this series received methicillin for 21 days or less.

Because of the dangers of procrastination and of therapy with ineffective agents, it is the authors' present policy to begin methicillin treatment of all severely ill patients suspected of staphylococcal septicemia as soon as cultures have been obtained unless there is a history of penicillin hypersensitivity, in which case vancomycin is administered. Therapy is later changed to penicillin G if culture reports and sensitivity data show that the organism is a susceptible staphylococcus.

The authors describe the results of therapy in 22 patients with staphylococcal septicemia who were treated with methicillin over a 10-month period. In 12 patients the infections were hospital acquired; most were associated with surgical procedures or severe debilitating diseases. In 21 patients the infecting staphylococci were penicillinase producers.

Sixteen patients (73%) were cured. Most of them responded dramatically within 48 hours of the beginning of medication. Five were definitely improved by therapy, although 4 died later of underlying diseases unrelated to infection. One patient was classified as a treatment failure, although he died of myocardial infarction after only 3 days of therapy.

No methicillin-resistant organisms were encountered. Two patients relapsed and in both cases staphylococci isolated after the initial course of methicillin therapy were found to be unchanged in their sensitivity to the antibiotic. The chief limitations of methicillin are the high cost, the necessity for frequent parenteral administration, and the occasional occurrence of hypersensitivity reactions.

Because of rapid renal excretion, intramuscular or intravenous injections every 4 to 6 hours are required. In 2 patients moderately severe hypersensitivity reactions developed. Transient azotemia occurred in 2 other patients during treatment, probably owing to staphylococcal toxins rather than to the medication. No patients had signs or symptoms of toxicity despite high serum levels in some cases of renal impairment.

The conclusion is reached that methicillin is probably at least as effective as vancomycin for the treatment of severe infections due to penicillin-resistant staphylococci and has advantages that make it the drug of choice in most cases. Methicillin has no advantages in the treatment of infections caused by other organisms or by penicillin-sensitive staphylococci.

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* Staphcillin^{R} (methicillin)

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2, 6-Dimethoxyphenyl Penicillin in Infants and Children

P.A. Day (1), Winifred Osborn, H. L. Weinberger, William Mesibov, Henry Robidoux, and P. F. Wehrle (2). Amer J Dis Child 102: 785-792, December 1961.

The control and treatment of disease due to staphylococci still present a serious medical problem in spite of the availability of many effective antibacterial agents. This is particularly true in the newborn nursery. With improved hygiene, better regulation of nurseries, and the use of potent antibiotics, staphylococcal infection still occurs with considerable frequency. Difficulties in the control of this infection lie both in the facility with which the organism is transmitted and in the variable antibiotic resistance patterns observed with hospital strains. Numerous studies and reviews of the epidemiology and bacteriology of nursery-acquired staphylococcal infections have appeared in the literature.

A new derivative of penicillanic acid, 2, 6-dimethoxyphenyl penicillin, * appears to inhibit the growth in vitro of staphylococci resistant to penicillin G. Since this isomer is well absorbed on parenteral administration and has been shown to be nontoxic in animals, it appears to offer considerable promise in the prevention and treatment of staphylococcal infections. The present studies have been designed to provide data regarding the absorption, toxicity, and efficacy of this drug in the treatment of staphylococcal infections in infants and children. Data are also provided concerning its effect as a prophylactic agent against staphylococcal implantation in the newborn infant.

It is noted that the colonization rate in controls as well as in injected infants varies from month to month. The low rate at the end of the present study indicates a "trough" in the colonization rate. As noted by other investigators at intervals, the carrier rate may vary quite independently of changes in nursery procedures. It is improper to conclude that the almost continuous use of dimethoxyphenyl penicillin in 10% of the newborn population over a 5-month period in itself led to the drop in colonization. The significance of this study lies in the difference in colonization rates between the injected and the control infants. The lack of emergence of resistant organisms over a 5-month period is of particular interest.

These data indicate that 2, 6-dimethoxyphenyl penicillin is rapidly absorbed and promptly excreted by young children. With doses of 25 mg and 50 mg per kg of the drug, children with noninfectious diseases demonstrated peak blood levels in one-half hour. Therapeutic levels were maintained for 3 or 4 hours after either dose. Approximately 48% of the injected penicillin was found in the urine in the first 6 hours, and the majority of penicillin excretion took place during this interval, except in the newborn in whom excretion was considerably delayed. In the 13 patients with proved staphylococcal disease, this drug produced excellent therapeutic results in staphylococcal infections due to both penicillin G-sensitive and -resistant strains. No demonstrable local or systemic toxicity was seen in this series of patients.

Data from newborns receiving single doses of 125 or 250 mg of dimethoxyphenyl penicillin provide evidence of a decrease in the frequency of colonization of staphylococci in nasal and umbilical areas when compared with their matched controls when cultured on the third day of life. This decreased incidence includes strains of staphylococci both sensitive and resistant to penicillin G. Since colonization rates on the fourth day were similar, it is apparent that for effective prophylaxis, more than one dose at birth is needed. Injections of 250 mg of dimethoxyphenyl penicillin on the first and third days of life decreased the frequency of colonization of staphylococci in nasal and umbilical areas when cultured on the fourth day of life.

These data suggest that this antibiotic may be useful in the interruption of outbreaks of nursery-acquired staphylococcal disease and in the treatment of established cases of this infection.

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* Staphcillin^{R} (methicillin)

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Surgery for Gallbladder Disease in Ohio - A Survey of 3085 Operations

E. C. Weckesser, * Cleveland, Ohio. Amer J Surg 102: 695-698, November 1961.

The author reports on this study of 3085 operations on the biliary tract for non-neoplastic disease carried out in thirty Ohio hospitals in eighteen communities in 1959. The study is based on thirty-one series of cases collected by members of The American College of Surgeons throughout the State. Twenty-five of these represented successive cases from the hospital in which the member surgeon operated. Six series were successive operations performed by the member making the report. Nearly all the operations were performed in 1959. Special attention was paid to the subjects of surgery, the type of operation, hospital mortality, frequency of cholangiograms, and indications for opening the common duct. Attention was also given to the status of the performing surgeons.

Analysis of Deaths

Seventeen of the thirty-eight deaths occurred among men, producing a mortality of 2.4% among men and .88% among women. Thirty-seven of those who died were white and one was a Negro. The average age of those who died

was 71 years, the range being from 49 to 85 years. Bronchopneumonia and peritonitis each accounted for six deaths, coronary thrombosis five, post-operative hemorrhage four; the balance were due to uremia, pulmonary embolus, persistent common duct obstruction, hepatitis, and severed right hepatic duct. An autopsy was performed on twenty of the thirty-eight who died. Fifteen of the deaths (39%) occurred in the 5% of patients who had emergency operations.

Summary

1. Of the patients, 74% were white women.
2. Preoperative X-ray films had an accuracy of 95% in predicting stones in the gallbladder.
3. Common duct exploration in patients with jaundice of any type yielded stone in 61%, without jaundice, in 38%.
4. Operative cholangiography was used prior to opening the common duct in 24% of patients and was the most accurate indication of stones in the common duct aside from a small group in which common duct stones were palpated.
5. Mortality showed a progressive climb in the older age groups, reaching 16% in those patients 80 years old and over. There were no deaths below the age of 40 years.
6. The over-all mortality was .78% for elective and 9.0% for emergency operations.
7. The mortality from cholecystectomy was sixteen times greater when performed as an emergency.
8. Mortality from common duct exploration was approximately six to seven times greater when performed as an emergency.
9. The lowest mortality (0.9%) occurred in the group operated upon by Fellows of The American College of Surgeons who were Board Certified. The over-all mortality in the entire group was 1.2%.

* From the Survey Committee of which Dr. Weckesser is Chairman, Ohio Chapter of the American College of Surgeons. Presented at the Fifth Annual Meeting of the Ohio Chapter, American College of Surgeons, Akron, Ohio, September 9, 1960.

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Reserpine and "Stress" Response

Reserpine, a widely used tranquilizer and antihypertensive drug, can interact with the body's nervous and hormonal mechanisms to produce a biochemical picture almost indistinguishable from the classical "stress" response evoked by prolonged exposure to cold, pain, and similar unpleasant stimuli, studies by Public Health Service scientists indicate. These findings are reported by Dr's Roger P. Maickel, Erik O. Westermann, and Bernard B. Brodie of the

National Heart Institute * in the current issue of the Journal of Pharmacology and Experimental Therapeutics.

The work cited is part of a program of research conducted by the NHI Laboratory of Chemical Pharmacology under the direction of Dr. Brodie. The aim of this program is a fuller understanding of the biochemical basis of behavior, particularly of those biochemical mechanisms that enable the organism to adapt to environmental changes.

The studies showed that reserpine, when given to rats, could cause excessive secretion of the pituitary hormone ACTH, the release from the adrenal glands of large quantities of corticosterone, and the mobilization of free fatty acids from the body fat depots. These responses to reserpine are strikingly similar to those evoked by prolonged exposure to cold, pain, and similar "stresses."

Even more paradoxical were the subsequent findings that the stress responses were set off only by doses of reserpine large enough to produce sedation, and apparently resulted from the same action of reserpine responsible for its tranquilizing effects. Further, the stress responses to reserpine could be prevented by monoamine oxidase inhibitors, a class of drugs usually employed as antidepressants rather than as "anti-stress" drugs.

The sedative and tranquilizing effects produced by reserpine result from its action on two brain amines: norepinephrine and serotonin. The drug blocks the ability of the brain to store these amines. As a result, large quantities of these amines are liberated to diffuse passively away or to be set upon and destroyed by enzymes. This steady drain eventually depletes the brain of most of its norepinephrine and serotonin.

A preponderance of free norepinephrine in the brain is usually associated with arousal and with active behavioral patterns, a preponderance of free serotonin with sedation, tranquility, and recuperative behavior patterns. Reserpine attacks the storage sites of both amines indiscriminately. However, as the brain levels of both decline, free serotonin predominates over free norepinephrine. This occurs because serotonin is made at a faster rate by the brain than is norepinephrine. The result: tranquility and sedation—up to a point.

The NHI studies showed that when brain amine levels dropped to about 50% of normal in reserpine treated animals, the pituitary and adrenal glands abruptly entered the picture. The pituitary began to release large quantities of ACTH which, in turn, triggered the release of corticosterone and other steroid hormones from the adrenal cortex. These hormones, acting in concert with catechol amines from the adrenal medulla or released locally in adipose tissue, led to the mobilization of free fatty acids. In short, these animals—outwardly tranquilized, even stupefied—were exhibiting most of the classic biochemical responses to stress.

Subsequent studies on this state of "stressful tranquility" showed that the pituitary-adrenal responses did not result from a direct action of reserpine. They were related, however, to the drug's depletion of brain amines, specifically serotonin. Whenever brain serotonin levels fell below 50% of

normal, the stress responses were elicited. They were not elicited by drugs which selectively depleted brain norepinephrine but not brain serotonin.

Monoamine oxidase inhibitors, widely used as antidepressant drugs, could block the pituitary-adrenal responses to reserpine. They did so by blocking the enzymatic destruction of the free amines released by reserpine. This action slowed the decline of brain amines and usually prevented them from falling as far as the magic 50% level.

The pituitary-adrenal response to reserpine would also disappear eventually even if further reserpine were administered. The pituitary, it appears, could not stand the strain forever and eventually ran out of ACTH to secrete.

Reserpine, grain alcohol, and a number of other so-called depressant drugs have been found to trigger the excessive secretion of ACTH by the pituitary that sets these "stress responses" in motion. How they do it is not yet known, but the NHI scientists are trying to find out. Basic knowledge about the interaction of drugs with the body's nerve and hormonal mechanisms is becoming increasingly essential to the proper therapeutic evaluation of new drugs. (NHI, PHS, DHEW)

* The National Heart Institute, located at Bethesda, Md., is one of the seven National Institutes of Health of the Public Health Service, Department of Health, Education, and Welfare.

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Conjunctival Blood Flow in Sickle-Cell Disease * Preliminary Report

Austin I. Fink, Tomoya Funahashi, Margaret Robinson, and R. Janet Watson, Brooklyn, N.Y. Arch Ophthal 66: 824-829, December 1961.

The development of a sickle-cell crisis remains one of the most interesting and fundamentally unsolved problems of sickle-cell disease. Presumably, the erythrocytes sickle in the small vessels where the oxygen tension is lower and one might expect a crisis to be accompanied by an increase in sickling in the vasculature of various parts of the body. The crisis is often characterized by episodes of generalized pain associated with fever. No hematologic data exist which can be used to diagnose the presence of such a crisis. One logical approach to investigating the mechanism of crisis would involve doing in vivo studies of the capillary circulation in sickle-cell anemia patients in and out of crisis. The bulbar conjunctiva lends itself ideally to such a study. Some reports have described the occurrence and presented sketches of capillary dilatations in the conjunctiva of patients with either sickle-cell anemia or hemoglobin-C disease. Such in vivo studies have been hampered by the unavailability of a technic for the study of blood flow. Development of the "Ophthalmic Microscope" has made it possible to visualize and photograph alterations of capillary blood flow in the bulbar conjunctiva of these patients.

The authors hope that such investigations may clarify the mechanism of crisis and symptomatology. The study is in the preliminary stage and investigations are now under way.

The presence of widespread blood sludging in the vessels of the bulbar conjunctiva in patients with sickle-cell disease was first reported by Knisely and co-workers in 1947. Reference has also been made to the avascular appearing bulbar conjunctiva in crisis. The vessels appeared to be in a state of vasoconstriction; this may be responsible for local anoxia with a tendency toward increased sickling in the vessels. The vasoconstriction and the sickling would both operate to produce a marked decrease in the velocity of blood flow in all patients in crisis. A more normal appearing conjunctiva was noted 3 days after transfusion.

Alterations in the vessels themselves included venous saccular dilatations and capillary microaneurysms. In 1952, Augusto de Quevedo noted that "a small number of smaller sized venules had sacculated segments," and Goodman and co-workers described a reversible saccular microaneurysm in the perilimbal area of the bulbar conjunctiva in a patient with hemoglobin S-C disease. The authors' findings in patients with S-S hemoglobin tended to localize in those areas of the bulbar conjunctiva that were usually hidden from sight by either the upper or lower lid. The microaneurysms were either "comma" or "s" shaped.

Reversibility of the vessel changes seemed related to the age of the patient. Heat from the examining light resulted in a disappearance of venous dilatations and capillary microaneurysms in patients under 11 years of age, presumably by dilating the vessel to the caliber of the aneurysm. Patients over 11 years of age had suffered many crises so that the aneurysms and dilatation were of greater magnitude. This might explain why dilating the vessel with heat—in the older age group—produced dilation, but not sufficient to approach the cross-section of these exaggerated changes. A marked exception was the 42-year old patient in whom warming of the conjunctival vessels caused disappearance of the capillary microaneurysms. Further investigation demonstrated that this was one of the mildest cases of sickle-cell disease ever to be followed at the Kings County Hospital. From these observations, the use of heat as a clinical therapeutic measure would seem warranted.

Instillation of Cyclomydril eyedrops containing phenylephrine produced a vasoconstriction which resulted in a return of the venous dilatations and capillary microaneurysms that were made to disappear with the use of heat from the examining light. In addition, these vessel changes were quantitatively more numerous after the eyedrops than before exposure to heat. Even in those cases where vessel alterations were irreversible (unaffected by heat), the use of these eyedrops temporarily increased the number of observable microaneurysms. Finally, in those younger children who did not demonstrate aneurysms or dilated veins, the use of Cyclomydril eyedrops resulted in their presence. The authors believe that the use of this medication represents a definite diagnostic test for this disease. No patient with A-A hemoglobin responded to Cyclomydril in the manner characteristic of patients with sickle-cell disease.

Nor did Cyclomydril or heat influence the findings in patients with proven S-A hemoglobin or in diabetics.

One might speculate as to the hemodynamics of these reversible saccular venous dilatations and capillary microaneurysms that become irreversible with time. The almost avascular appearance of the bulbar conjunctiva in crisis, a result of marked vasoconstriction, has already been noted. Mention has also been made of the anoxia that may result in an increased sickling in these vessels. An area of constricted vessel lumen plugged with a group of sickle cells might represent the beginning of local vessel wall weakening. Sickle cells plugging a vessel lumen and producing a local anoxia might affect adversely the metabolism and oxygen supply of the local endothelial cells and thereby create an area of wall weakening. This may represent the beginning of sacculations (venous) and capillary microaneurysms that become more firmly established with each succeeding crisis and, in time, are irreversible. An explanation is, therefore, offered for the increased morbidity and mortality of older patients with sickle-cell disease.

* Presented before the Society for the Study of Blood, New York Academy of Medicine, March 28, 1961. Research supported by Grant No. H-3978 (R1) from the National Heart Institute, National Institutes of Health, Bethesda, Md.
From the Division of Ophthalmology and the Department of Pediatrics of the State University of New York, Downstate Medical Center.

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Fluid Shifts After Hemorrhage

C. H. Baker and J. W. Remington, Department of Physiology, Medical College of Georgia, Augusta, Ga. Amer J Physiol 201: 910, November 1961.

Fluid shifts were followed in acutely splenectomized dogs by recording changes in hematocrit, plasma specific gravity, total cell volume (Cr^{51}), and plasma volume (T-1824). The dogs were subjected to two serial bleedings, not sufficient in amount to produce consistent change in pressure, and then a third bleeding to lower the mean pressure to about 60 mm Hg. The first two bleedings produced small declines in plasma gravity in about half the dogs. The hematocrit changed less which seemed to be evidence for a recruitment of red cells from some unknown locus. This recruitment was verified by total cell volume measurements. When the added cells were taken into account, the tagged cell technic followed the known loss of blood with an average error of but 1%. After the third hemorrhage, most dogs showed a plasma gain of ultrafiltrate. Hematocrit and cell volume changes now often depicted a loss of red cells from the circulation. Agreement between expected and measured plasma volumes was not good. A large part of this discrepancy can be ascribed to a steepening of the disappearance slope, a result of the bleeding itself.

* * * * * *

SPECIAL NOTICE

Officer Preference and Personal Information Card

The attention of all officers of the Medical Department is invited to BUPERS Instruction 1301.25A. This reference sets forth detailed instructions regarding submission of the new Officer Preference and Personal Information Card (NAVPERS 2774).

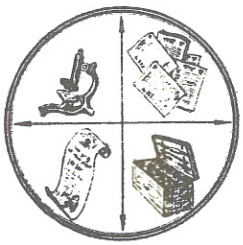
It appears that many officers neglect to submit these cards because they feel they are not used. It is pointed out that after being processed through the Bureau of Naval Personnel, preference cards are forwarded to the Bureau of Medicine and Surgery to become part of each officer's record. These cards are constantly utilized in making assignments and their importance cannot be emphasized too strongly. They should be submitted annually or when significant changes occur. The items that receive particular attention in thisBureau are duty preferences, dependency status, ages of dependents, current residence, and any comments contained in Item 24 (Remarks). Careful attention should be given to the completion of Section 20 (Next Duty Preferences). The block beneath sea, overseas, and shore should be filled in to indicate which type of duty is first, second, or third choice. Nurse Corps officers are requested to completely fill out Item 17 (Dependent Members of Household) when applicable, and to note in Item 24 (Remarks) whether or not dependents are living and moving with them.

Officers who consistently indicate preference for a specific geographic area, with little or no consideration given to the type activity and/or primary billet, may penalize themselves professionally. The officer who is enamored with one Coast, or who prefers "any billet" so long as he gets a particular area, should be aware that his assignment may be inconsistent with the enhancement of his professional qualifications and illogical in consequence of his prior training and experience. In proposing officers for changes of duty, needs of the service are balanced carefully against career requirements and personal preferences. The officer who shows willingness to subordinate professional qualification to an area choice takes an extremely shortsighted view of his career.

This Bureau commends and wishes to assist officers who aspire to attainment of further education. To this end, whenever preferences are based on the desire for assignment near a civilian university in order to earn credits in part-time educational programs, every consideration consistent with service needs will be given.

Although Officer Preference and Personal Information Cards should normally be submitted annually on 1 October, a submission is welcome at any time an officer desires to indicate a change in his duty preference(s) or when some other factor arises which he desires to report for consideration.

It is recommended that all Medical Department officers review their service records to determine whether they contain a copy of the current preference card as required by BuPers Manual Art. B-2207(4)(b). If not, officers should submit a current card immediately.



MISCELLANY

Protozoan and Helminth Parasites in Peoples of Taiwan (Formosa)

R. E. Kuntz, J. C. Burke, S. Lin, and R. H. Watten, U. S. Naval Medical Research Unit No. 2, Taipei, Taiwan and 406th Medical General Laboratory, Camp Zama, Japan. From J Formosan Med Assn 60: 28 Sept 1961.

As part of a program for the evaluation of intradermal tests for the diagnosis of trematode infections on Taiwan (Formosa), single stool and sputum samples were examined from 1997 persons living in seven different localities in Taiwan. The incidence for the intestinal protozoa was erratic with a range of 2 to 29, 5 to 39, and 5 to 37% respectively for Entamoeba histolytica, E. Coli, and Endolimax nana. Although a point of conjecture, it seems possible that consumption of water of questionable potability may account for higher incidences of amebas in 3 of the 7 villages. Iodamoeba bütschlii and Chilomastix mesnili showed a maximum incidence of 3 and 4% respectively, and Giardia lamblia occurred in 3 to 10% of persons examined. One individual passed an abundance of cysts and trophozoites of Balantidium coli.

Helminths were well represented with Ascaris, hookworm and Trichuris occurring in 43 to 92, 34 to 79, and 29 to 99% respectively of persons examined. There was a single infection with Hymenolepis diminuta, 3 with Trichostrongylus, but none with H. nana or Strongyloides, although epidemiologic factors would suggest their presence. The customs of the different peoples encountered, plus suitable epidemiologic conditions, favored infection by certain trematodes. Clonorchis and Fasciolopsis occurred in 1 to 34 and in 1 to 24% respectively of individuals studied, whereas Paragonimus was present in 6 and 7% of people in 2 areas favorable for paragonimiasis. Metagonimus was limited to a few persons in 3 of 7 localities. No genuine cases of schistosomiasis were detected, although S. japonicum-like parasites continue to be found in snails (Oncomelania) and lower vertebrates, and epidemiologic factors are such as to allow infection of man.
(Research Report MR 005.09-1601.3.4)

Acknowledgements: The nature of the present study is such that its success has depended in great part on the cooperation and help rendered by numerous persons, some of whom cannot be acknowledged directly. However, the authors wish to express their appreciation to: The Provincial Commissioner of

Health, Dr. C. H. Yen, and officials at health stations in areas where persons were skin tested; to Mr. Soichi Asakura, Mr. Yoshimasa Hishinuma and other staff members of the Medical Zoology Department of the 460th Medical General Laboratory for assistance in examination of stools; and to James E. Reese HMC USN, Woodrow L. Bistline HMC USN, and R. Davis HM1 USN of NAMRU No. 2 for general technical support. They also wish to acknowledge Mr. Lo, Chin-tsong, Mr. Lane, Chautyen, and Mr. Charles Chang of NAMRU No. 2 for general technical assistance and for their part in serving as interpreters.

* * * * * *

Physiologic Effects of Breathing 100% Oxygen at 10,000 Feet

The Bureau of Naval Weapons has been interested in incorporating a closed circuit 100% oxygen rebreathing system in an aircraft with operational altitude of 40,000 feet and cabin altitude of 10,000 feet which will be involved in flights up to durations of 6 hours. The Air Crew Equipment Laboratory, Philadelphia, Pa., was authorized to determine whether any respiratory symptoms, indicative of the toxic effect of oxygen, could be evidenced in continuous exposures to 100% oxygen for 6 hours at an altitude of 10,000 feet.

Accordingly, four U. S. Navy enlisted personnel were exposed to three 6-hour tests breathing 100% oxygen. One test was conducted at a simulated altitude of 10,000 feet and two tests were conducted at sea level. Pulmonary function assessment and chest X-ray examinations were accomplished before and after each exposure. The following tests to assess the ventilatory function performed by the lungs were utilized: (1) Vital Capacity, (2) Timed Vital Capacity, (3) Inspiratory Capacity, (4) Expiratory Reserve, and (5) Alveolar Gas Uniformity.

Results of the pulmonary function studies and radiologic assessment of the subjects' lungs indicate that respiratory symptoms referable to the noxious effect of oxygen could not be demonstrated. Subjective symptoms—i.e., intermittent chest discomfort, occasional nausea, and chilliness—were evidenced in the sea level tests only, although none of these symptoms persisted or were particularly irritating. Nonpersistent dry cough was experienced in all of the studies, however. This is believed to be due to the dryness of the oxygen breathed.

From these studies, it is concluded that continuous exposure to 100% oxygen at 10,000 feet for periods up to 6 hours is without demonstrable physiologic alteration of the respiratory system. (CAPT R. A. Bosee MSC USN, Director, Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pa.)

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Darius was clearly of the opinion that the air is also man's dominion.
—J. T. Trowbridge

From the Note Book

THE SURGEON GENERAL'S LETTER—Re: Use of Emergency Resuscitation Equipment. On 5 January 1962, Rear Admiral Edward E. Kenney MC USN, the Surgeon General, issued the following letter to Commanding Officers of U.S. Naval Hospitals and Senior Medical Officers of other inpatient treatment facilities. It is published here with his approval as a possible service to other Medical Department personnel or activities.

> "Proper training in the use and care of emergency life-saving equipment is a 'must' for personnel of every naval medical activity.
>
> The Inspector General, Medical, has noted that some personnel (including officers) responsible for administering emergency treatment are not familiar with the use and operation of emergency resuscitation equipment. It is self-evident that the usefulness of this equipment is impaired if personnel responsible for its operation are not thoroughly schooled in its application.
>
> To avoid fatal misadventure, I encourage you to insure that personnel under your jurisdiction are trained in the use of all emergency life-saving equipment used in emergency rooms or ambulances. Refresher training should be conducted as necessary. A Medical officer should be assigned responsibility for inspection and maintenance of resuscitation equipment as well as instructing Medical Department personnel in its use. Medical officers trained in aviation medicine or submarine medicine are especially qualified for this function at many activities. At naval hospitals, this function might appropriately be administered by the Anesthesiology Service.
>
> Recent issues of the U.S. Navy's Medical News Letter (18 August 1961, page 9; 22 September 1961, page 14; 3 November 1961, page 18) outline procedures utilized by the San Diego and St. Albans Naval Hospitals to train personnel in the proper use of such equipment. These articles may be of value as you examine your own program."

Medical Support for Space Flight - Change in Convening Date. Subject course was announced in the Medical News Letter, Vol. 38, 4 August 1961. This course has been rescheduled and will be conducted 4 - 29 June 1962 by the School of Aerospace Medicine, Brooks Air Force Base, Texas. SECRET clearance is required. Requests for attendance must reach the Bureau of Medicine and Surgery not later than 15 March 1962. (Training Branch, Professional Div., BuMed)

Encouraging Developments in Trachoma Research. The U.S. Naval Medical Research Unit #2 in Taipei, Taiwan, has reported new "encouraging" developments in trachoma research. These developments were revealed at the 54th Annual Meeting of the Formosan Medical Assn, November 25 - 26, 1961.

For the past two years NAMRU-2, under the direction of Captain Robert A. Phillips MC USN, has been conducting intensive research on

trachoma, a virus disease of the eye which affects some 400,000,000 people and is particularly virulent in Asia. Their work has included vaccine studies in animals and man.

In a paper entitled "Experimental Trachoma Vaccine Studies in Taiwan Monkeys" by NAMRU-2, Doctors Wang San Pin, J. Thomas Grayston, A. Fredrick Rasmussen, and Robert L. Woolridge, it was reported that definite immunity to trachoma can now be demonstrated. In repeated tests, these researchers showed that solid immunity existed in Taiwan monkeys to repeated eye inoculations with live trachoma virus. Their findings confirm the possibility that trachoma, a blinding disease of the eyes, can be effectively prevented by the use of properly prepared and administered adjuvant vaccines.

The vaccine studies revealed that monkeys which were first immunized with a Freund type adjuvant (booster type) vaccine were either resistant to a large infection or showed a mild clinical reaction which disappeared in a few days. The control group monkeys, inoculated with live trachoma virus at the same time, developed severe symptoms and showed no signs of cure. NAMRU-2 investigators have also been carrying out trachoma vaccine studies in pre-school children on Taiwan in cooperation with the Provincial Public Health Administration.

In commenting on the effectiveness of the new vaccine, Captain Phillips stated that "Our interpretation of these results so far is that, although the trend is very encouraging, the annual rate of conversion to trachoma of around 6% is still too small to determine precisely the efficacy of the vaccine. Observations of the two groups are continuing and will be reported later."

Captain Robert A. Phillips MC USN, Commanding Officer of Naval Medical Research Unit #2, has been reappointed as a Director of the United States Educational Foundation (USEF) in the Republic of China, as recently announced by the U.S. Foreign Service. He was also appointed Board Chairman for the term beginning 1 January 1962 and ending 31 December 1962 representing the third year of service in these two appointments.

Everett F. Drumright, U.S. Ambassador to the Republic of China, said of Captain Phillips: "May I take this opportunity to thank you again for your excellent direction of USEF/China operations during the year. Your background in both the educational and international exchange fields has been an invaluable asset to the progress of the Foundation."

(TIO, BuMed News, 13 December 1961)

New Carrier to be Named AMERICA. President Kennedy has selected the name AMERICA for the attack carrier CVA-66. The keel of the carrier, now being built at the Newport News Shipbuilding and Drydock Co., in Virginia, was laid on 9 January 1961. Commissioning is scheduled for the fall of 1964.

Three former Navy ships have borne this name: a 74-gun ship-of-the-line presented to France in 1782, a racing schooner acquired by the Navy in 1862, and a German liner taken over by the Navy in July 1917 and used for transport duty. (NavNews, 1 February 1962)

DENTAL SECTION

How to Deliver Papers at Dental Meetings

Ralph J. Audy, University of California Medical Center, San Francisco, Calif. Dental Abstracts 7(1):45, January 1962.

Research which remains uncommunicated to others is work for private edification. Communication should be regarded and taught as a necessary part of research. Communication demands thought and effort commensurate with that spent on research.

Although man's greatest distinguishing characteristic is his ability to indulge in and communicate rational thought, this ability is lagging far behind his collective ability to gather knowledge.

The aims of written and spoken communications are: (1) to inform and educate by presenting new material, or old material in a new light; (2) to stimulate intellectual interest and (3) to challenge the audience or reader to individual thought based on aroused curiosity.

A paper in print and the same "paper" delivered personally at a meeting are two different communications. They cannot possibly be both identical and equally effective. Therefore, it is necessary to prepare two versions, one for print and one for delivery. These should differ in a number of features.

Printed matter makes use of paragraphs, headings, numbering, quotation marks, indentation, and type faces, to help the reader arrange his thoughts. Substitutes for these must be provided in the lecture.

The reader adjusts his rate of reading to suit his rate of comprehension. The listener is forced to follow the tempo of the lecturer. The lecturer therefore should pay special attention to this point. He must take care that he conveys information and does not merely state information. He may convey a difficult concept by combining blackboard illustrations or slides. He should make sure that no logical steps leading to conclusions are ommitted, although these steps often are left out in print. He may attempt to provide visual and other associations, combined with apt phrases to help the listener to remember.

The paper for publication should be complete in the sense of containing, by word or reference, the data necessary to support the conclusions. The lecture, however, should convey broad messages and ignore details which can be checked in the paper or brought out by discussion if necessary. Numbers should be rounded off in the lecture, or shown in charts.

Certain common defects of lecturers which may ruin their presentations include: disregarding the time limit; defective projection facilities and technics; poor vocal delivery; cramming too many ideas or facts into the available time; failure to omit every item of supporting evidence or experimental detail not essential to make a point; use of too many or too few slides; use of slides that contain too much detail or that are illegible.

In preparing a lecture, first ask: What does this particular audience want or need to know? Then ask: What do I want to say?

Try to restrict tabulations to three rows of three numbers, rounded off, without decimals.

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Results of Pulpitis Treatment

W. Kunzel, Dental Clinic, Humboldt University of Berlin, Invalidenstrasse 87/89 Berlin N. 4, Germany. Results of Pulpitis Treatment: A Clinical and Histological Study. Dental Abstracts 7(1): 6, January 1962.

Because of the difficulties encountered in preparing for histopathologic study of the extremely delicate pulp tissue enclosed in the hard tooth structures, few investigations have been carried out to correlate accurately the clinical symptoms of pulpitis with the histopathologic changes occurring in the pulp.

The success of treatment of pulpitis usually is ascribed to the use of certain compounds or certain methods. The results published in case reports seem to indicate that factors other than the method of treatment influence the outcome significantly.

A carefully controlled study of 114 patients with pulpitis was carried out at the Dental Clinic of the Humboldt University in Berlin.

The results were as follows:

1. There were 53.3% failures in instances in which carious dentin had been left over the pulp, whereas only 15.3% failures occurred in instances in which the carious dentin was eliminated completely.

2. The involved teeth were vital, hypersensitive to applied heat or cold, and showed pulp exposures that were detectable by using explorers or excavators.

3. The majority of the teeth were sensitive to percussion showing varying degrees of reactions ranging from mild to severe.

4. Diagnosis of pulpitis by roentgenographic examination alone appeared almost impossible because many of the involved teeth displayed thickening of the periodontal membrane spaces in the periapical region.

5. Roentgenograms were useful in indicating or suggesting possible pulp exposure caused by a deep cavity or restoration, fracture, attrition and other possible causes of exposure.

6. In all instances of pulpitis, the inflammation of the pulp was most severe in the region adjacent to exposure.

7. In instances in which the practitioner has taken into account the

condition causing toothache and has arrived at an accurate diagnosis, the teeth often can be saved from extraction by the judicious use of therapeutic and restorative technics.

The prognosis in most instances of pulpitis is favorable, especially if all carious dentin is eliminated without pulp exposure, and if no significant involvement of the apical periodontium is present.

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Roentgen-ray Barrier Efficiency of Commonly Used Building Materials

Walter S. Moos, et al. College of Medicine, University of Illinois, Chicago, Ill. Oral Surg, Oral Med, Oral Path 14:569-573, May 1961. Dental Abstracts 7(1):30-31, January 1962.

A study was made of the efficiency of 15 commonly used building materials as barriers against roentgen rays.

Two dental x-ray machines—a Weber model no. 11 and a Weber model no. 12 RM, operating at nominal kilovoltage range—were used. The materials tested, and their thicknesses, were as follows: pine, 9/16 inch; birch, 9/16 inch; lucite, 3/8 inch; plasterboard, 3/8 inch; mosaic tile, 2/5 inch; partition clay tile, 1-1/2 inch; window glass, 1/8 inch; transite, 3/16 inch; asphalt floor tile, 1/8 inch; galvanized iron, 1/32 inch; cabinet steel, 1/20 inch; terra-cotta tile, 1-1/8 inches; Waylite tile, 3 inches; press tile, 2-1/8 inches; and concrete, 1-1/2 inches. Two radiation measuring devices—a Westinghouse Probitron and a Victoreen ionization chamber—were used. The percentage of roentgen-ray transmission was determined for each material. The target-to-instrument distance was 40 cm with the absorber surface facing the tube located at 17 cm from the target.

The absorption efficiency, described in terms of half-value layers, was determined for most of the building materials, with the use of six different beam qualities. (A half-value layer is the thickness of a material that will reduce beam intensity by one half.)

Pine, birch, plasterboard, mosaic tile, window glass and asphalt floor tile had only slight absorption values; although frequently used for wall partitioning, these materials are poor absorbers of roentgen-ray radiation.

Galvanized iron, 1/32 inch, and cabinet steel, 1/20 inch, are effective barrier materials for roentgen-ray radiation commonly found in dental offices.

The growing popularity of multiple-office professional buildings presents a problem in the control of radiation emanating from x-ray machines in adjacent offices.

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Personnel and Professional Notes

New Courses Added to the Dental Corps Extension Program. Two new home study extension courses, Periodontics and Fixed Prosthesis, will be available about March 15, 1962, to Dental officers of the U.S. Navy, Naval Reserve, and to Dental officers of the regular and reserve components of the other branches of the Armed Forces.

The course Periodontics, NavPers 10758, should be considered as a review of the diagnosis and management of periodontal disease, and not as a comprehensive study of the field. One of the primary aims of the course is to aid the Dental officer in detecting those conditions conducive to periodontal disease and in correcting such conditions before periodontal disease develops. The textbook used in this course is Clinical Periodontology, Second Edition, 1958, by Irving Glickman.

The first of 9 assignments reviews the characteristics of healthy oral tissues in order to provide a concept of the normal periodontium. The next 4 assignments discuss the clinical conditions, the etiology and the diagnosis of periodontal disease. The final 4 assignments cover the treatment of periodontal disease, including the principles of occlusal equilibration used in the management of periodontal disease.

The course Fixed Prosthesis, Prosthodontics, Part III, NavPers 10410, consisting of 7 assignments, is the third in a series of 3 courses in prosthodontics and deals with restorations that are supported entirely by natural teeth. It is designed to provide a practical and professional course of instruction in fixed prosthesis.

The textbook used in this course is Theory and Practice of Crown and Bridge Prosthesis, Third Edition, by Stanley D. Tylman. Included in the course is the Glossary of Prosthodontic Terms, Second Edition, prepared by the Nomenclature Committee of the Academy of Denture Prosthetics.

The first assignment reviews various factors related to the construction of fixed prostheses. Later assignments deal with the selection of retainers, abutments, and artificial teeth; preparation of teeth, construction of retainers; complete veneer porcelain crowns; complete veneer metal crowns; crowns with dowels; and finally with the construction and repair of fixed partial dentures.

These courses complete the basic series of postgraduate level extension courses offered by the U. S. Naval Dental School to augment the continuing education program of the Naval Dental Corps. The courses now available are:

Course Title	No. of Assignments	Units	Reserve Point Credit
Endodontics, NavPers 10407	3	1	9
Operative Dentistry, NavPers 10759	6	1	12
Oral Diagnosis, NavPers 10739	10	2	20
Oral Surgery, NavPers 10729	10	3	30

Course Title	No. of Assignments	Units	Reserve Point Credit
Periodontics, NavPers 10758	9	3	27
Prosthodontics, Part I, NavPers 10763	6	2	18
Prosthodontics, Part II, NavPers 10764	6	2	18
Prosthodontics, Part III, NavPers 10410	7	2	21
Dental Dept Administration, NavPers 10736-A	12	2	24
U.S. Naval Dental Clinic Administration, NavPers 10401-1	6	2	18

Dental extension courses are offered by the Department of the Navy to provide Dental officers with a balanced educational program. They are not intended to replace short postgraduate courses, graduate courses, residency training, or the many excellent educational experiences now enjoyed by officers of the Dental Corps. They are designed, rather, to assist Dental officers—especially those at sea or at remote stations—in providing Navy and Marine Corps personnel with the highest possible type of dental service. Through these courses Dental officers on active duty are able to receive many of the benefits of advanced training without depriving military personnel of their services during the training period. Dental officers of the Naval Reserve, on inactive duty, are enabled to maintain a level of knowledge consistent with Dental Corps policy relating to treatment and treatment planning in the management of dental facilities. In addition, Dental officers of the Naval Reserve, on inactive duty, earn promotion and retirement points upon successful completion of each course or course unit.

Application for enrollment should be submitted on NavPers 992, Application for Enrollment in Officer Correspondence Course, via official channels, to the Commanding Officer (Code 5), U.S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland.

Deputy High Commissioner Benitez Visits BUMED. Mr. Jose A. Benitez, Deputy High Commissioner Trust Territory of the Pacific Islands, recently met in the Bureau of Medicine and Surgery with Rear Admiral E. C. Kenney, the Surgeon General, and Rear Admiral C. W. Schantz DC USN. Among the subjects discussed was the Observership Training program being conducted at the U.S. Naval Dental Clinic, Guam, for Trust Territory dentists. The training program consists of 6 to 8-week informal refresher courses in Oral Diagnosis, Preventive Dentistry, Operative Dentistry, Exodontia, Oral Surgery, Endodontics, and Prosthetic Dentistry.

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AVIATION MEDICINE DIVISION

The World's Largest Human Centrifuge

Cdr B. F. Burgess, Jr., MSC USN, Head, Aerospace Medicine Division, Aviation Medical Acceleration Laboratory, Naval Air Development Center, Johnsville, Pa.

This is the first in a series of articles designed to familiarize the reader with the research conducted at the Aviation Medical Acceleration Laboratory (AMAL), Naval Air Development Center, Johnsville, Pennsylvania. This article deals primarily with the laboratory's major research tool, the world's largest human centrifuge. Subsequent reports will deal with specific research projects conducted by the Physiology, Biochemistry and Psychology Divisions of this laboratory.

In 1945 most speculations regarding man's travel into outer space were relegated to science fiction articles and to such comic strip characters as "Buck Rogers." It was in this year, however, that a group of forward thinking people from the Bureau of Medicine and Surgery, the Bureau of Aeronautics, and the Office of Naval Research established the requirements for a new type of human centrifuge. It is this centrifuge, 15 years later, that is playing a most important role in our national Man-in-Space Program. The planning group of medical scientists and engineers is to be complimented for their foresight in laying down requirements for a new and unique device capable of spanning 15 years of research in Aviation Medicine with only minor modifications. The human centrifuge at the Aviation Medical Acceleration Laboratory (AMAL) located at the Naval Air Development Center, Johnsville, Pennsylvania, has been a prime facility for studying acceleration problems from the early stages of jet flying to the present day rocket-boosted travel into outer space.

On 24 May 1949 the AMAL was established by the Chief of Naval Operations with its stated mission, ---"to perform research and development in the field of aviation medicine pertaining to the human centrifuge." Since this time, however, the mission of the laboratory has increased in scope to cover other aspects of aviation medicine.

The current mission of the AMAL is to:

Conduct research, both applied and basic, in the general field of aviation and space medicine, physiology and biochemistry. To study the

performance and behavioral mechanisms of biological systems in aerospace environments.

Develop, improve, test and evaluate aviation and astronautics personnel equipment and related aircraft and spacecraft components.

Foster close working relationships with opposite numbers in the Bureau of Medicine and Surgery and the Bureau of Naval Weapons in order to assure maximum technical effectiveness.

Provide consulting and advisory services to the Bureau of Medicine and Surgery, the Bureau of Naval Weapons, other government contractors.

Conduct placement, management and technical supervision of research and development projects and programs for systems and components as required.

Prepare specifications for systems and equipment.

The first director of AMAL, Captain John R. Poppen MC USN, now retired, reported for duty in 1949. At this time the laboratory was little more than a cylindrical concrete building which caused much speculation among the local residents.

The main housing for the centrifuge is a cylindrical reinforced steel and concrete building, 130 feet in diameter. In the center of the 110 foot operating floor is a 180 ton, 4000 horsepower motor built by the General Electric Company. The rotor is directly connected to the 50 foot tubular steel centrifuge arm. At the terminal end of this arm is an oblate spheroidal gondola mounted in a 2-gimbal support. These gimbals can be rotated by means of electric-hydraulic motors mounted on the gondola to be continuously positioned through the resultant of the radial, tangential, and vertical components of acceleration when the arm is in motion. With this system any G vector can be selected as desired by the investigator.

The gondola is of sandwich construction with spun aluminum inner and outer layers. It is designed to carry a pay load of 600 pounds and can be decompressed to simulated altitudes in excess of 35,000 feet. Air conditioning provides a temperature range of 44° F to 110° F. Close study of the subject during operation of the centrifuge is effected through the use of television and movie cameras and other special physiological sensing and measuring devices.

The gimbal control motors are mounted in the counterweight and drive the gimbal system through shafts running the length of the arm. The gimbal motor control circuits and physiological recording circuits are linked to control and recording stations by means of slip rings on the rotor shaft. The entire centrifuge room is carefully shielded to protect the delicate physiologic instrumentation circuits from magnetic and electrical interference. Floor, walls, and ceiling of the centrifuge chamber are sheathed with 1/16" copper.

The centrifuge arm, gondola, gimbals, counterweight, and gimbal control mechanisms together weigh 84,000 pounds. This tremendous mass must be rotated under close control to develop accelerations from a dead stop to 180 mph (40 G) in approximately 7 seconds.

One may feel inclined at this point to raise the question: "What avenues of investigation can this centrifuge explore which could not be done by the older centrifuges?" First, let us consider the field of rapidly developed G forces. Other human centrifuges require a much longer time to develop a high degree of acceleration stress. Time and G are irrevocably interlocked in the development of physiological derangements under this type of stress. Since an airplane develops G forces rapidly in violent maneuvers, one can easily see that a truer picture may be obtained by a device that develops the largest G stress in a minimum period of time.

Second, the older centrifuges have free swinging cars or platforms and the radii of their arms vary from 12' minimum to a 23' maximum. Since a free swinging car on a relatively short arm results in a difference in G stress between the head and the feet of the subject, there may be as much as a 25% differential along the axis of acceleration, as in the case of the smallest of the old centrifuges. These shortcomings are eliminated to a large extent by the 50' arm and controlled positioning of the gondola in the AMAL centrifuge. Rapid deceleration as well as spins and tumbling may be simulated which provides an excellent facility for studying certain aircraft emergency conditions.

Third, the gondola itself offers numerous advantages over the swinging cars of the older centrifuges. Due to its construction it can be evacuated to simulate altitudes above 35,000 feet. Temperature control of the environment inside the gondola provides a method for studying the effect of heat such as might be prevalent during the reentry phase of orbital vehicles, on G tolerance and human performance.

The ability to withstand high positive G loads of the type developed in aircraft has come to be regarded by some pilots as a criterion of physical prowess. The "sea stories" told by old-time carrier pilots about how they "pulled 12 G and didn't even blackout" are legendary in squadron ready rooms. Although the low performance centrifuges were not able to duplicate adequately such G-time patterns as were reportedly flown in aircraft, the available evidence suggested that such superhuman G tolerance was more fictional than factual. The human centrifuge at AMAL provides the aviation physiologist with a research tool which is capable of duplicating, and in fact exceeding, the performance of aircraft in the development of high loads. Therefore it was only logical that one of the earliest investigations undertaken at AMAL was to define more accurately human tolerance to high positive G loads applied at a rate of 5 to 10 G per second, and to investigate the physiologic factors involved.

Preliminary studies on the effects of high G forces were carried out upon chimpanzees in an effort to predict the probability of high G loads producing irreversible damage. Chimpanzees were selected for the first experimental runs on the centrifuge for two reasons: first, their size and body configuration are similar to those of the human; and second, the chimpanzees seemed much less apprehensive than the humans about being the first experimental subjects to ride on the new type centrifuge.

From these early animal experiments it was possible to extrapolate and to predict safe limits for human acceleration studies. These experiments were designed to study the tolerance of the chimpanzee to loads calculated to be 2-1/2 times that required for human work. From these investigations it was concluded that the safe tolerance limit of the chimpanzee was not exceeded by the 40 G runs of 15 seconds duration applied in either the transverse, positive or negative directions. It was also concluded that it was safe to carry out investigations in human tolerance to positive and transverse G in gradually increasing increments of magnitude up to a maximum of 15 G. Due to the more serious effects produced by the negative G runs, it was considered unsafe to carry out investigations in human tolerance to this stress beyond those already reported, that is, 3 G for 15 seconds or 5 G for 1 second.

Following the animal work, human subjects were exposed to high positive G loads, and the durations of these loads required to produce unconsciousness were measured. Measurements were made on 11 subjects (without anti-G equipment) up to a maximum of 15 G. Unconsciousness was determined by subjective experiences and, objectively, by the failure of the subject to respond to visual and auditory stimuli. At 15 G subjects remained conscious for 1.28 seconds, at 12 G for 1.64 seconds, at 10 G for 2.24 seconds, at 8 G for 3.00 seconds, and at 6 G for 4.20 seconds.

Investigations on the effect of transverse G showed that humans can withstand 21 G for 5 seconds in the supine position without adverse effects. While being totally submerged in water one subject was able to withstand 31 G (transverse) for 5 seconds. Some disorientation was caused by this high G level; however, all symptoms were of short duration.

This work, some of it conducted on the centrifuge during its early years of operation, proved valuable in determining the seat design and acceleration limits for our current manned space vehicles.

Prior to June 1957, the centrifuge was controlled either manually or by cams, giving the experimental subject the acceleration he would receive, if he were an occupant of an aircraft. In that year, in cooperation with the Aeronautical Computer Laboratory (ACL), also located at the Naval Air Development Center, Johnsville, Pennsylvania, centrifuge dynamic control simulation was developed.

In this technique, pilot control signals from within the centrifuge gondola go to one of the world's largest analog computers at the ACL. This device then computes the accelerations which the pilot would receive if he had made the same control motions in flight in the particular aircraft being simulated. These computed accelerations are then converted into drive signals for the centrifuge so that the pilot actually receives these same accelerations. At the same time the computer drives the cockpit flight instruments to show the changing conditions of the flight. With this technique of centrifuge dynamic control simulation it is now possible to "fly" an aircraft or spacecraft whose characteristics have been determined by design and wind tunnel experimentation before the aircraft is actually built.

Two major centrifuge simulation programs have been conducted in the past few years. The first program was carried out in cooperation with North American Aviation, Inc. This project was to determine whether predicted accelerations for extreme emergency conditions in the X-15 experimental aircraft could be tolerated by the pilot on re-entering the atmosphere. Evaluation of pilot performance capabilities as well as physiological tolerance was an important phase of this study.

Over two hundred dynamic simulated X-15 flights were made. This is probably several times the number of flights which will be made in the actual aircraft. The centrifuge is able to simulate more extreme flight conditions, and these at a faster rate than can be examined in actual flight. Several conditions lead to exceeding both man and aircraft control capabilities. The X-15 was "crashed" numerous times on the centrifuge without endangering the life of the pilot or harming the actual aircraft. After a "crash" the centrifuge is brought to rest safely by automatic limits, by centrifuge observers, by the medical officer, by the computer operator or by the pilot himself. In this manner many "bugs" were eliminated in the X-15 programs without endangering the pilot and at a relatively low cost.

The second and more recent simulation program has been in connection with Project Mercury. During this program each of the 7 astronauts spent several hours making simulated space flights in the Mercury mockup on the centrifuge. A full set of flight instruments and a flight controller, similar to those of the Mercury spacecraft, were installed in the centrifuge gondola. Like the X-15 project, the flight profiles were initiated by the computer operating on data obtained from ballistic missile flight tests and from mathematical calculations.

The training sessions on the centrifuge made it possible to safely investigate most of the extreme flight conditions anticipated in an actual orbital flight. The realism and effectiveness of the flight simulation program on the centrifuge were attested to by Commander Alan B. Shepard, USN after his suborbital Mercury flight.

The future of centrifuge dynamic control simulation seems very significant in the testing of the control system and cockpit design of new aircraft and spacecraft, under the stresses of the accelerations expected in actual flight. These are simulations —they can only be relied upon to the extent that we trust our predictions as to the actual conditions of flight. Man himself must venture into this unknown to obtain the certain knowledge. But with centrifuge dynamic control simulation these adventures are not totally strange—at least with respect to certain of the accelerations experienced.

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Every man can be seen as a fraction, whose numerator is his actual qualities and its denominator his opinion of himself. The greater the denominator, the less is the absolute quantity of the fraction.

—Panin

Feasibility Studies for Hearing Conservation Program Aboard CVA-Type Aircraft Carriers

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The study was undertaken to explore the feasibility of implementing a hearing conservation program aboard a CVA. USS Saratoga (CVA-60) was selected because of special facilities and equipment which had been built in or placed aboard for the purpose. The study included evaluation of feasibility of conducting hearing tests in such a facility under full operational conditions, complete survey of the noise environment of the ship under the same conditions, and evaluation of several group and individual automatic types of audiometers to determine the optimal combination for testing large numbers of personnel.

Time-intensity-frequency graphs of the sound field at selected positions of flight deck and hangar deck were derived from six-hour samples taken during air operations, recorded on tape, and analyzed by the Noise Cumulator. In ship's spaces where the sound field is more uniform, graphic sound level meter records were taken for shorter representative periods. Several spaces in addition to flight deck and hangar deck were identified as "hazardous" areas from the standpoint of risk of acoustic trauma.

Two group audiometers, the Maico R-4 and the Ampex NMRL types, and the Rudmose ARJ-3 automatic (individual) audiometer were tested by repeated audiograms on a group of 33 men from four different working divisions (experimental group) and the six members of the Naval School of Aviation Medicine team (control group). Comparison of control group audiograms in the laboratory and aboard ship shows that given a well designed double-walled testing facility such as the one which has been built into the Saratoga, reliable audiograms can be obtained. Comparison of audiograms of control and experimental groups under ship's condition varying from "in port, quiet" to full air operations, shows no significant difference based on ship's operational condition. It is therefore concluded that, given equipment and testing facility such as those on the Saratoga, the volume of audiometry necessary to a hearing conservation program can be accomplished, provided the personnel in question can be tested on a reasonable schedule as determined by their duties and the motivation of their superiors to assure their arrival at the time and place for testing. Recommendations are made with respect to types of audiometers to be used in such a program.

Since the time of the study outlined above, and as a result of it, several things have occurred. Three group audiometers have been or are being developed. Bids for several of one type have been accepted, together with double-walled sound rooms similar to that on the Saratoga and these are being installed on the Forrestal class carriers as they are built. A training course has been instituted at School of Aviation Medicine to prepare corpsmen to operate the new instruments as well as to give them training in other

instrumentation and information necessary to the audiometry and sound measurement required in the implementation of the Navy's Hearing Conservation Program. Instrumentation and trained audiology-acoustic technicians are also being supplied to Naval and Marine Air Stations. It is hoped that, as data begin to arrive from these ships and shore installations, we shall move closer to the objective of reducing acoustic trauma and the noise hazard as these relate to aircraft.

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Preliminary Investigation of Bacterial Viability and Virulence in Closed Ecological Systems

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It is generally accepted that a closed oxygen system will be maintained in the pioneering, if not the later versions, of manned space capsules. The advantage of such an engineering improvement lies primarily in the decreased weight of a closed atmospheric system, as opposed to bottled and compressed oxygen sources.

In a closed oxygen system, the possibility of contagious diseases and epidemics is evident. Carriers with resistant type bacteria could infect other members of the crew with critical results. It has been postulated that in certain types of oxygen regenerative systems, bacteria would be destroyed or reduced to an ineffective level, thus minimizing this hazard. As early as 1894, Lubinski [1] showed that the virulence of Staphlococcus aureus was reduced when grown in a pure oxygen atmosphere. Felton[2], in his work with pneumococcus type I stated that the virulence of the bacteria is reduced when grown in a 100% oxygen environment or in a 100% carbon dioxide environment. These findings were supported later by Schlayer[3].

Other workers in this area have found that microorganisms are injured or inhibited in their growth rate when cultured in the presence of 100% oxygen. Cleveland[4] reported that protozoa are injured and ultimately killed by high oxygen concentrations. Karsner, et al[5] showed that some bacteria are inhibited in growth rate when exposed to high oxygen concentrations. He also found that the same was true of Scleratinea, Monilia, and Cryptococcus, but that rate of growth returned to normal when the cultures were removed from the 100% oxygen atmosphere[6].

All of these experiments, however, were conducted at sea level with oxygen pressure at 760 mm/Hg. Breathing oxygen at this pressure for extended periods of time, however, is known to have a deleterious effect on the human respiratory system. Proposals have been advanced that at altitudes of 27,000 - 35,000 feet the detrimental effect of 100% oxygen would be eliminated or reduced to a negligible factor. It then becomes pertinent to determine what changes in growth rate and virulence of certain types of bacteria occur at an absolute pressure of 225 mm/Hg in an atmosphere of pure oxygen.

The purpose of the first phase of this experiment, therefore, was to study in vitro the effects of 100% oxygen on several types of bacteria maintained at 27,000 feet for twenty-four hour periods for a total of two weeks.

Six types of bacteria were exposed for 24 hours to a simulated altitude of 27,000 feet with 100% oxygen, the temperature being maintained at 37° C. Six control groups were tested at sea level with 21% oxygen at 37° C. No differences were found between the controls and experimental bacteria in growth rate, pH, or virulence in vitro.

It is strongly recommended that those closed oxygen systems that have been reported to have bactericidal action be investigated at sea level and at reduced atmospheric pressures.

Exposure to 100% oxygen at 27,000 feet has no apparent effect on the viability or virulence of the six kinds of bacteria tested in the first phase of this study. This finding is apparently due to the reduced partial pressure of oxygen at 27,000 feet, which contrasts with results of other studies in this area which have been conducted at sea level.

(1) Lubinski, W. Ueber die anaerobiose bei der eiterung. Centralbl. f. Bakterial u. Parasiten, 1894, 16, 769-775.

(2) Felton, L. D. Effect of oxygen on virulence of growing pneumococci. J. Exper. Med., 1932, 56, 27-38.

(3) Schlayer, C. Influence of oxygen tension on respiration of pneumococci (type I). J. Bact., 1936, 31, 181-189.

(4) Cleveland, J. Effect of high oxygen concentrations on protozoa. Biol. Bull., 1925, 48, 455-459.

(5) Karsner, H. T., Boittinghan, M. L., and Richardson, J. J. Growth inhibition of bacteria in high oxygen concentrations. J. Med. Res., 1923, 44, 83-89.

(6) Karsner, H. T. and Saphir, O. Influence of oxygen on growth of certain molds. J. Infect. Dis., 1926, 39, 231-236.

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Eye Disqualifications of Student Naval Aviators

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In the Medical News Letter, Vol. 38, No. 4, pp. 22-26, 18 August 1961, LCdr A. J. Grote MC USN reported a study of the physical defects found in prospective flight students over a four month period in 1960. The eye

disqualifications in that study constituted one-half of the total physical defects found on examination of these prospective flight candidates upon reporting to the Naval School of Aviation Medicine at Pensacola, Florida. It is the purpose of this report to outline and discuss the eye physical defects which disqualified prospective students for flight training over a 12 month period, from October 1960 to October 1961.

From the enclosed table it will be noted that a total of 108 problem eye cases were evaluated by the Department of Ophthalmology, School of Aviation Medicine, after they were repeatedly examined by the Aviation Examining Room and referred on consultation. Of the 108 candidates disqualified for flying, only 38 were salvaged: 14 by being placed in the "myopic study group"; 6 where surgery was performed; and 18 placed in the Naval Aviation Officer program to qualify for navigator/bombardier training. There were 70 candidates who went back home or to the fleet. It is to be remembered that all of these flight candidates had been previously found physically qualified in the field for flight training.

One-half of the total disqualifications were due to muscle balance problems, the majority of which were connected with evaluation of esophoria. The excessive esophorias, greater than 10 diopters, were not of a particular problem, but with the cases who failed the red lens test, failed the Verhoeff test, or who had deficient prism divergence, all were due to an esophoria.

In a darkened room performing the Maddox rod test for horizontal phorias, if the candidate has a tendency toward esophoria, in many cases, excessive readings are found by the Maddox rod test because reflex convergence is called upon. This is known as "instrument convergence" or "instrument awareness." Thus, cases with orthophoria or a small esophoria will have excessive esophoria readings under the conditions mentioned above, using the Maddox rod. Conversely, exophoria patients will have less exophoria under similar conditions because of this reflex convergence. Therefore, false excessive esophoria readings and false deficient exophoria readings are often obtained by the Maddox rod test. Intermittent occlusion or "breaking" of one eye will give more accurate determinations. Also, a "cover test" should be required for the motility examination.

Since the red lens test is a subjective test for diplopia, the candidate learns by repeated examinations that he should not see two images. Therefore, the initial red lens test is considered to be the only valid one.

The candidates who failed the Verhoeff test on repeated examinations as well as other stereopsis tests were usually due to the presence of a small angle of esotropia and third degree fusion was not present.

In the testing of prism divergence, it is urged that only 2-3 runs be made per examination in the A.M. or P.M., and that the candidate be returned the following day for repeated testing and this should be done prior to the phoria determination.

In the testing of the hyperphorias, using the Maddox rod, it is cautioned that the patient should be so positioned that his chin is neither depressed nor elevated, and he is looking straight ahead in order that a head tilt will not compensate for a latent hyper-deviation.

The second largest group of disqualifications was for an unaided vision of not being 20/20 and the presence of some myopia in certain meridians. In the performance of the cycloplegic examination for candidates for flight training, it is urged that one use the proper cycloplegic and that the patient be refracted at the proper time interval following installation of the cycloplegic in order to obtain the maximum relaxation of accommodation. When a refraction is performed more than 1 hour after the instillation of a proper cycloplegic, the maximum cycloplegia has been lost and some latent hyperopia is not uncovered, or a false myopic determination may result. If the candidate (after he has had the cycloplegic drug instilled and is being tested at the proper time interval thereafter) can read 20/20 with no "ifs, ands, or buts," one knows that he should not have any myopic meridian. To doubly confirm this, if one places a +0.25 sphere in front of the eye and he can still read 20/20, it is further confirmation that he does not have a myopic meridian while under cycloplegia. Believe your retinoscopy!

In the small group where one eye could not be corrected to 20/20, there was present a small angle esotropia with a very mild amblyopia.

In that group of candidates disqualified for flight training because of external ocular pathology, pterygia with corneal encroachment were the greatest in number. They were qualified for flight training following successful pterygia surgery, as was also the limbal dermoid case. Two cases were found unfit for military service and appeared before a Board of Medical Survey, due to the presence of an early keratoconus and a history of retinal detachment surgery. The keratoconus case should have been detected by the examining flight surgeon because of the presence of a "scissors" movement on retinoscopy which made the cycloplegic refraction extremely difficult.

It may be of interest that during this 12-month period, five naval aviation observer candidates were also surveyed from service because of disqualifying ocular defects: Keratoconus - 2; Orbital fracture with diplopia on up gaze - 1; Ptosis due to myasthenia gravis - 1; Cataracts, pre-senile, bilateral - 1.

In the evaluation of prospective Student Naval Aviators in the field, the examining flight surgeon is assisted greatly by his aviation medical technician. It is urged that all flight surgeons in the field be familiar with the methods, and the standards for the evaluation of vision and muscle balance of the flight candidates; also, that he be sure that his AVT is aware of and does use the proper techniques for evaluating the muscle balance using the Maddox rod and prisms. The busy flight surgeon is fed data by his AVT for most of the ocular examination. He should never accept marginal or borderline findings without personally performing the determinations himself. At the time of the general physical examination, the examining flight surgeon should check the pupillary reactions, should use the ophthalmoscope, and should do an external eye examination with a good light. If these orderly procedures had been carried out, the external disease pathology found in the table of this article would have been avoided. Also, the Standard Form 89 should be thoroughly evaluated for a history of eye surgical procedures, particularly for pterygia and muscle imbalance. A

flight physical examination for a student should never be considered complete unless the Farnsworth Latern has been specifically used for determination of color vision and the Verhoeff stereopter for the determination of depth perception. Since a cycloplegic refraction is required for the aviation physical examination for the Student Naval Aviator, great care, diligence and competence should be used in the performance of this examination.

All examining flight surgeons are urged to again read the report by Dr. Grote, as previously mentioned, as to the problems encountered in the physical examination for prospective flight students. The candidate who "squeaks" through (either by his own intent or by the laxity of the examining, "being a good Joe" flight surgeon) will be detected in the Aviation Examining Room of the School of Aviation Medicine at Pensacola. Then the disappointed candidate will return home or enter the Fleet as an enlisted man; will be a morale problem; will cost Uncle Sam a tremendous amount of money; and the "good Joe" flight surgeon in the field in reality will not be a "good Joe" at all. Pressures, be they external or psychological, made on the flight surgeon should be laid aside, and the complete aviation flight physical examination for a prospective flight student should be made objectively, diligently, correctly, and with a strict adherence to the existing standards.

EYE DISQUALIFICATIONS - STUDENT NAVAL AVIATORS
SCHOOL OF AVIATION MEDICINE - 10-1-60 to 10-1-61

	DISQUALIFIED AS SNA	QUALIFIED AS SNA	QUALIFIED AS NAO
VISION			
Myopia	36	Myopic Study 14	12
One eye not correcting to 20/20	8	Group	
	44		
MUSCLE BALANCE			
Red lens diplopia	20		
Failed Verhoeff	10		1
Excessive exophoria	8	1	1
Hyperphoria	5		
Deficient prism divergence	4		3
Deficient PC	1		
	54		
PATHOLOGY			
Ptergyium	4	4	
--- Limbal dermoid	1	1	
Corneal scar	1		
Keratoconus	1		
History of detached retina	1		
	8		
COLOR VISION			
Failed FA Lant	2		
TOTAL CASES	108	20	18
TOTAL DISQUALIFIED	70		
TOTAL SAVED	38		

RESERVE SECTION

Annual Report of Retirement and Promotion Credits Earned

Officers of the Ready and Standby Reserve may obtain an annual report of retirement credits earned and promotion credits earned in grade from the Reserve Officer Recording Activity, Omaha, Nebraska.

This report will not be furnished officers in the Retired Reserve, since they cannot earn retirement points while on inactive duty and the report furnished just prior to retirement remains current for all practical purposes.

The annual report will contain the following information: (a) retirement points earned for previous anniversary year; (b) years of satisfactory Federal service and retirement points earned subsequent to 1 July 1949; (c) total years of satisfactory Federal service; and (d) promotion points earned in grade.

Retirement points earned prior to 1 July 1949 increase the amount of retired pay; however, they do not affect the computation of years of satisfactory Federal service since all honorable service in an accredited component of the Armed Forces prior to 1 July 1949 is satisfactory Federal service regardless of points earned. Therefore, due to administrative cost, officer records will not be researched to determine total cumulative retirement points earned prior to 1 July 1949 until the officer concerned has completed 20 years of satisfactory Federal service.

The annual report will be furnished only once each year in response to an annual request. Form NavPers-534 should be used for requesting this report. This form may be obtained from Naval District Headquarters, Naval Reserve Training Centers, Naval Air Stations, and Naval Air Reserve Training Units. While it is desirable that all requests for the annual report be submitted on Form NavPers-534, a letter request will suffice in those cases where it is impractical to obtain the form.

Requests should not be submitted until 4 months after the termination of the anniversary year as complete participation for that year is not recorded before that date. These requests will be answered as time permits during the reserve officer's ensuing anniversary year and will indicate retirement and promotion points credited as of his last anniversary date. Follow-up requests for this information shall not be made as it will serve only to delay processing requests already received.

If a discrepancy between the personal records of the officer and the annual report exists, the following action will be taken for reconciliation:

(a) For Active Duty or Active Duty for Training, the officer concerned should submit certified copies of orders with all endorsements to the Reserve Officer Recording Activity.

(b) For Drills, the officer concerned should check first with units in which there has been drill attendance during the period in question to resolve discrepancies. If drills are not properly recorded at the Reserve Officer Recording Activity, the appropriate commanding officer should submit a certified copy of Form NavPers-1259, Quarterly Naval Reserve Drill Report, clearly marked "SUPPLEMENTAL" or "CORRECTED," showing drills attended. This report should be sent to the Reserve Officer Recording Activity via the District Commandant or Chief of Naval Air Reserve Training for certification as to correctness. In the case of reports which are 3 or more years old, a statement must be made to the effect that information submitted has been verified by substantiating documents.

(c) For Correspondence Courses, if a certificate has been received, the officer concerned should submit a certified copy to the Reserve Officer Recording Activity. If a certificate has not been received, the officer concerned should address an inquiry to U. S. Naval Correspondence Course Center, Scotia, New York, for courses administered by that center, or to the cognizant activity administering the correspondence course. (BuPers Manual, Article H-2211, pg 545, Ch. No. 5)

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Additional Selective Service Call for Physicians

On 8 November 1961, the Department of Defense asked for the issuance of the third Special Selective Service call during December 1961 - January 1962, for 345 physicians to be assigned duty with the Army. The increments in physician and allied specialists strength which Selective Service calls are bringing to duty with the Armed Forces, have been worked out in consonance with the manpower objectives of the three military medical services, which were developed to support the increases in Armed Forces strength stemming from the military build-up announced by the President, and approved by Congress in July 1961.

Prior calls issued during 1961 were: 14 June for 185 physicians (150 for the Air Forces; 35 for the Navy), and on 2 October for 495 physicians (275 for the Army, 70 for the Navy, and 150 to the Air Force) together with 154 dentists and 67 veterinarians for allocation to the Army. These draft calls represented the minimum professional component accessions, in the quantitative sense, which were necessary to bring the military medical services personnel strengths to a level consistent with the provision of currently authorized standards of medical care and the conduct of related and collateral medical service responsibilities. The physician requirement in support of the build-up could not be met by the arbitrary extension of duty tours of physicians serving for 2 years with the military medical services, because virtually all of this group of physicians who normally terminate their military service shortly after 1 July each year, had been released before the build-up was announced. Maximum realization has been made of such physician resources as were readily available to the Department of Defense through the curtailment of the retirement of Regular officers by restricting voluntary separations of career reservists and through

intensified recruiting. It was recognized from the beginning however, that the major proportion of the additional requirement for physicians would have to be met from the recall of substantial numbers of reservists, or by the alternative issuance of Selective Service calls for physicians. The latter course would obviously entail bringing to active duty physicians in the younger age group—generally those just completing internship. Actually, this is the type of physician which is required at the present time by the Department of Defense, and to utilize fully-trained residents or older physicians from private practice in meeting our requirement for general-duty type physicians would not be consistent with the principles of good medical management. The rationale underlying the Department of Defense decision to ask Selective Service for the call-up of needed physicians, was transmitted to the Association of American Medical Colleges, and to the American Medical Association Council on National Security. No significant objection was raised by either agency and no other feasible course of action was recommended for employment by the Department of Defense in meeting its objectives. (Progress Report — Nov-Dec 1961, Office of Deputy Assistant Secretary of Defense (Health and Medical)).

(concluded in next issue)

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